

REMARKS

The Office Action of April 24, 2006, has been carefully considered.

The specification has been amended to add a reference to the corresponding PCT application and to add proper subject matter headings. In connection with this, the initial paragraph on page 8 of the application has been canceled and replaced with a Brief Description of the Drawing and an initial paragraph under the Description of the Preferred Embodiments.

Claims 1 to 8 have been rejected under 35 USC 103(a) over Froberg et al in view of Moody.

Claims 1 through 18 have now been canceled and replaced by a new set of Claims 19 through 27. Claim 19 is directed to a composite ceramic body comprising carbon-containing fibers and silicon carbide and having a core area and a surface area. The body has a content of silicon carbide which decreases in substantially a substantially continuous manner from the surface area to the core area, and the fibers in the surface area have a lower filament count than the fibers in the core area. This new claim is clearly supported by the specification in the paragraph bridging pages 2 and 3.

The object of the invention is a composite ceramic body which has good long term behavior with lesser tendency to form surface cracks, and good ductility in the core area.

Froberg et al discloses a brake material formed from molded carbon fibers which are pyrolyzed. According to column 4, lines 20 et seq, the friction faces of the carbon core are converted to a stable refractory metal carbide of a predetermined depth and a predetermined nature. At lines 29 through 41, it is disclosed that:

"To convert the friction faces, a refractory metal powder

such as silicon powder is placed in contact with the friction face surface of the carbon disk. It is desirable to have the metal powder to be at least 50 mesh and more preferably 200 mesh in order to react properly with the carbon surface. With the refractory metal powder in contact with the friction face surface of the disk, the disk and powder are heated to the range of approximately 1400°C. to approximately 2000°C. under argon gas at one atmosphere...This treatment causes the powder to melt, wet and diffuse into the surface of the carbon core."

Moreover, in order to adjust the porosity, lines 51-53 disclose:

"This porosity can be adjusted by the densification process and by grinding away the surface to expose the pores after densification."

As the conversion takes place only in that area of the core in which it contacts the powder such as the silicon powder, it is clear that a constant change of SiC proportion from the core to the surface cannot be realized; indeed, from Fig. 3 it is clear that there is a sharp break between the converted surface area and the fiber-containing core. Moreover, there is no disclosure or suggestion of using different filament counts of the fibers in the core and the surface areas.

The Moody reference also contains no suggestion of using different filament counts. Moody relates to a thermal protection system especially intended for the aerospace industry which is a carbon-carbon ablator, and which has a relatively low cost, low density, high mechanical strength and high degree of protection from oxidation (see Claim 4). No reference is made to a tribological component.

In order to provide a sufficient thermal insulation, it is possible to change the density of the thermal protection

system material, as disclosed at column 4, lines 58-64:

"Fiber density can be varied by varying either the weaving method or the type of fabric used (i.e. woven, non-woven, knitted or braided fabrics). In addition, the invention may include needling of the fabric, which increases the interconnection of the fibers across the structure's thickness (the z direction)."

This increases the thermal conductivity. However, there is no disclosure or suggestion of producing monolithic properties in a surface and ductile areas in a core area in this reference. More specifically, there is no disclosure or suggestion in Moody to use fibers for the surface area that have a lower filament count than in the core area in order to obtain a ceramic article which has greater ductility in the core area. Moody is not concerned at all with obtaining a ceramic article, and there is no reason why one of ordinary skill in the art would combine Moody with Froberg et al since the subject matters of these patents are different.

Thus, neither Froberg et al nor Moody discloses or suggests a ceramic article in which the silicon carbide content decreases in a substantially continuous manner from the surface area to the core area, and the fibers in the surface area have a lower filament count than the fibers in the core area. Withdrawal of this rejection is requested.

Claims 1 through 8 have been rejected under 35 USC 103(a) over Hecht in view of Moody.

Hecht discloses fiber-reinforced carbon and graphite articles which are also friction discs (column 1, line 37). These disks have high through-thickness thermal conductivity and *isotropic properties* (see Abstract), which requires homogeneous density distribution. Accordingly, the bulk density prior to CVD infiltration and after CVD infiltration

is disclosed in each example. A graduated silicon carbide proportion is not disclosed, suggested or desired, since such a graduated proportion would contradict the desired isotropic properties. Hence, Hecht does not offer any suggestion of producing the presently claimed article, and does not disclose any method of doing so. Moreover, the use of fibers with different filament counts is not disclosed or suggested.

The Moody reference does not cure the defects of the Hecht reference for the reasons discussed above, and withdrawal of this rejection is requested.

In view of the foregoing amendments and remarks, Applicants submit that the present application is now in condition for allowance. An early allowance of the application with amended claims is earnestly solicited.

Respectfully submitted,



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